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seem to prove conclusively that OLTMANN's intensity theory is right, and that SACHS's ray direction theory is wrong. This chapter alone is no mean contribution.

At many points the author opposes LOEB's conception of response. This is done with vigor, if not with feeling. Quotations from the summary of part II put forth some of the questions in dispute: "There is no conclusive evidence, except perhaps in animals with image-forming eyes, showing that light acts continuously as a directive stimulus, that symmetrically located sides are continuously stimulated, equally when the light intensity on them is equal, unequally when it is not, and this regulates orientation by regulating the rate of motion of the locomotor apparatus on the two sides as is demanded by the theories of DECANDOLLE, LOEB, VERWORN, DAVENPORT, and RÁDL."

"There is no conclusive evidence showing that orientation in light is ever due to tropic reaction in any organisms, if the definitions of tropisms given by LOEB, VERWORN, or RÁDL are used as criteria."

"The idea of reactions to change of intensity, however, is not original with LOEB, as is sometimes assumed. The explanations of reactions to light given by ENGELMANN, BERT, GARBER, LUBBOCK, ROMANES, DARWIN, and others, all of whom preceded LOEB, were largely founded on this idea."

The work in the main agrees with JENNINGS' results and conclusions from his extensive studies. It supports his views on trial reactions, motor reflex, physiological state, and the adaptive character of reactions.—WILLIAM CROCKER.

#### MINOR NOTICES

**Trees and shrubs of Southern California.**—Abrams<sup>3</sup> has published the results of an extended field and herbarium study of the trees and shrubs of southern California. The territory involves about 40,000 square miles, or approximately one-fourth the area of the entire state. The author gives a careful consideration of the general physiographic and phytogeographic features of the southern portion of the state, and divides this area into three floral regions: (1) *the coastal slope*, (2) *the mountain*, and (3) *the desert*. The species of the first region are said to be "principally of Californian origin," of the second "boreal or of boreal ancestry," and of the third "endemic or migrants from the Great Basin, Sonora, or Lower California." Each floral region is divided into zones, in accordance with MERRIAM's outline, and these again are defined and characterized in more or less detail.

The body of the work bears the modest title of "Annotated catalogue of the southern California trees and shrubs." It is indeed far more than the term "catalogue" implies, since the text is provided with succinct keys to genera and species in most of the larger groups; there is also a limited amount of synonymy, copious notes, and ample citation of exsiccatae. New species

<sup>3</sup> ABRAMS, LEROY, A phytogeographic and taxonomic study of the southern California trees and shrubs. Bull. N.Y. Bot. Gard. 6:300-485. pls. 10. 1910.

are recorded in *Lupinus* (*L. Brittoni*), *Amorpha* (*A. occidentalis*), *Ceanothus* (*C. austro-montanus*), and *Malacothamnus* (*M. Nuttallii*); and several new combinations are made. The work includes 375 recognized species, representing approximately 150 genera, distributed in 57 families. Whether or not we agree with the limitation of groups and the nomenclature in all cases is a matter of minor significance. It is a pleasure to state that the author has given us a work which will serve as an exceedingly helpful guide in studying the woody plants of southern California.—J. M. GREENMAN.

**North American Flora.**<sup>4</sup>—Volume III, part 1, contains a treatment of the Nectriaceae and Hypocreaceae by F. J. SEAVER, the Chaetomiaceae by H. L. PALLISER, and the Fimetiariaceae by D. GRIFFITHS and F. J. SEAVER. These four families are represented by 242 species which are referred to 45 genera. One new species is described in *Scoleonectria* (*S. tetraspora*), found growing on trunks of cacao in Jamaica, and four new species from eastern and central United States are added to *Chaetomium*.—J. M. GREENMAN.

**Revision of Eucalyptus.**—The recent issue of Volume II, part 2, continues MR. MAIDEN'S<sup>5</sup> excellent revision of this genus. The present part contains descriptive matter relating to ten species and four full-page illustrations. This work can be used advantageously in conjunction with the "Forest flora of New South Wales" by the same author.—J. M. GREENMAN.

## NOTES FOR STUDENTS

**Cystidia of Coprinus.**—BULLER<sup>6</sup> has given an interesting account of his studies on the cystidia of *Coprinus atramentarius*. The lamellae of this species are very thin, broad, with parallel sides, and lie very close together. Because of their soft texture and extreme flexibility, many of them would lie very close together, or actually adhere, were it not for some kind of stay or prop for spacing them. The spores, then, which are shot off from the sterigmata could not fall down and out from the interlamellar spaces. The cystidia function as props to hold the lamellae equidistant. They are large cylindrical cells, with a slender stalk, which grow out from the subhymenium, the broad portion extending across the interlamellar space against the opposite gill surface or sometimes slightly entering it. They are 120-170×20-30  $\mu$ , quite evenly distributed, there being about 75-100 on each square mm. of gill surface.

<sup>4</sup> North American flora, Vol. III, part 1, pp. 1-88. New York Botanical Garden. December 29, 1910.

<sup>5</sup> MAIDEN, J. H., A critical revision of the genus *Eucalyptus*, Vol. II, part 2, pp. 61-100, pls. 53-56. Sydney: William Applegate Gullick. 1910.

<sup>6</sup> BULLER, A. H. R., The function and fate of the cystidia of *Coprinus atramentarius*, together with some general remarks on *Coprinus* fruit bodies. *Annals of Botany* 24:613-629. pls. 50, 51. 1910.